

REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Office Action dated February 22, 2005 (U.S. Patent Office Paper No. 02102005). In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

As to the PTO-Form 1449 submitted with the Office Action dated February 22, 2005 (U.S. Patent Office Paper No. 02102005), as to the "lined-through" document, submitted concurrently herewith is the postcard evidencing receipt in the United States Patent and Trademark Office of the Information Disclosure Statement and the identified document, Japanese 2000-099281, on March 6, 2002. Submitted concurrently herewith is another copy of this previously submitted document together with the corresponding PTO Form-1449. Acknowledgement and consideration of this document is respectfully requested.

In regard to the objection to the "oath" being informal, Applicants respectfully submit that submitted with the application was a Declaration in lieu of an Oath in accordance with 37 CFR §1.68 and is therefore proper. Reconsideration and withdrawal of the objection to the submitted Declaration is respectfully requested.

Also, submitted with the application on March 6, 2002 was a certified copy of the corresponding priority document. Acknowledgement of receipt of the certified copy of the corresponding priority document is respectfully requested.

Status of the Claims

As outlined above, Claims 1 through 11 are presently pending in this application. Claims 1, 2 and 4 through 9 are being amended to correct formal errors and to more particularly point out and distinctly claim the subject invention. Entry of the amendments to Claims 1, 2 and 4 through 9 is respectfully requested.

Additional Amendments:

Figures 23 and 25 have been amended as outlined in the attached Letter to the Office Draftsperson, and as shown in the accompanying revised sheets of drawings for Figures 23 and 25. Specifically, in Figure 23, the spelling of the word "balancing" has been corrected.

Also, in Figure 25, the spelling of the word “boundary” has been corrected. Entry of the amendments to the Specification and to the Drawings is respectfully requested.

Prior Art Rejection

Claims 1, 2, 4 and 6 were rejected under 35 U.S.C. §103(a) over the admitted prior art, hereinafter referred to as Admission, in view of U.S. Patent No. 6, 804,245 to Mitchem et al., hereinafter referred to as the Mitchem ‘245 patent. This rejection is respectfully traversed.

Claim 3 was rejected under 35 U.S.C. §103(a) over the Admission in view the Mitchem ‘245 patent, and further in view of U.S. Patent No. 6, 374,336 to Peters et al., hereinafter referred to as the Peters ‘336 Patent. This rejection is respectfully traversed.

Claims 9 through 11 were rejected under 35 U.S.C. §103(a) over the Admission in view of the Mitchem ‘245 patent, and further in view of U.S. Patent No. 5, 680,539 to Jones , hereinafter referred to as the Jones ‘539 patent. This rejection is respectfully traversed. The above rejections under 35 U.S.C. §103(a) of Claims 1 through 4, 6 and 9 through 11 will be considered collectively.

It is respectfully submitted that the Admission, the Mitchem ‘245 patent, the Peters ‘336 patent, and the Jones ‘539 patent do not disclose, teach or suggest, among other features:

- a switch installed in said clustering disk controller and connected to said channel control units and host computers, wherein the switch comprises a data table for holding correspondence information between a destination channel control unit which is an access destination set by the host computer and a channel control unit which actually transfers the access request, as respectively recited in Claim 1;

- a switch installed in the clustering disk controller and connected to the channel control units and host computer, wherein the switch comprises a data table for holding information on whether or not to transfer data to a different channel control unit from the channel control unit which received the access request from the host computer, as respectively recited in Claim 2;

- wherein plural channel control units can be specified as the destination of the access request from the host computer, and the data table stores a probability that an individual channel control unit of the plural channel control units will be selected as a channel controller which actually forwards said access request, as

respectively recited in Claim 3;

a service processor (SVP) which manages the information in the disk controller and modifies the data table, as respectively recited in Claim 4;

a switch equipped with a data table for transferring an access request from a host computer to the channel control units, and the method comprising a step of transferring an access request from the host computer to a predetermined channel control unit based on said data table, as respectively recited in Claim 6;

wherein the SVP looks up load information for the channel control units, and modifies the data table so that an access request from the host computer addressed to a channel control unit under heavy load, is transferred to a channel control unit under low load, as respectively recited in Claim 9;

wherein the SVP looks up fault information for the channel control units, and modifies the data table so that an access request from the computer addressed to a faulty channel control unit, is transferred to a normal channel control unit, as respectively recited in Claim 10; and

wherein the SVP looks up load information for the channel control units, and modifies the data table so that the processing level with respect to the channel control unit under low load is increased, as respectively recited in Claim 11.

The present invention provides a clustering disk controller and its load balancing method, whereby a switch holding table can modify a destination of a request from a host computer, whereby the switch transfers an access request to another channel according to a destination channel status, such as a heavy load or fault, and the channel which received the request processes the request by proxy for load balancing between internal disk controllers, as respectively recited in the method and apparatus of Claims 1 through 4, 6, and 9 through 11.

The Office Action dated February 22, 2005 (U.S. Patent Office Paper No. 02102005), recognizes that the Admission does not include such above described features of Claims 1 through 4, 6, and 9 through 11.

Further, such above-described features are not disclosed in the Mitchem '245 patent, the Peters '336 patent, and the Jones '539 patent in relation to a switch holding table for modifying a destination of a request from a host computer, whereby the switch transfers an access request to another channel according to a destination channel status, such as a heavy

load or fault, and the channel which received the request processes the request by proxy for load balancing between internal disk controllers, as respectively recited in the method and apparatus Claims 1 through 4, 6 and 9 through 11 of the present invention.

In contrast, the Mitchem '245 patent is directed to a shared route lookup table for a fiber channel switch directed to a route table for ports in a switch 100 (Col. 4, lines 18-26), and is directed to exit port identification (Col. 7, lines 28-46).

Further, in contrast, the Peters '336 patent is directed to a probability distribution for selecting a storage unit for storing a segment and its redundancy information may be uniform over all the storage units (Col. 76, lines 25-30).

Additionally, in contrast, the Jones '539 Patent is directed to a disk array system is directed to a system, whereby the disk array includes a plurality of disk drives, wherein when a new drive is inserted in the disk array, the disk controller performs data reconstruction operations to place data on the new drive. (Col. 10, lines 9-15). Therefore, the Jones '539 patent is not directed to a switch holding table that can modify a destination of a request from a host computer, whereby the switch transfers an access request to another channel according to a destination channel status, such as a heavy load or fault, as respectively recited in Claims 1 through 4, 6, and 9 through 11 of the present invention.

In view of the foregoing, it is respectfully submitted that Claims 1 through 4, 6, and 9 through 11 are not obvious over the Admission, the Mitchem '245 patent, the Peters '336 patent, and the Jones '539 patent. Withdrawal of the rejections of Claims 1 through 4, 6 and 9 through 11 under 35 U.S.C. §103(a) is respectfully requested.

The Office Action states that dependent Claims 5, 7 and 8 were objected to as being dependent upon a rejected base claim (U.S. Patent Office Paper No. 02102005, page 2). However, in view of the foregoing discussion, dependent Claims 5, 7 and 8 have presently not been rewritten in independent form.

Reconsideration and allowance of Claims 1 through 11 are respectfully requested.

Conclusion

In view of all the above, Applicants respectfully submit that certain clear and distinct differences as discussed exist between the present invention as now claimed and the prior art references upon which the rejections in the Office Action rely. These differences are more than sufficient that the present invention as now claimed would not have been anticipated nor rendered obvious given the prior art. Rather, the present invention as a whole is

distinguishable, and thereby allowable over the prior art.

Conclusion

Favorable reconsideration of this application as amended is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and telephone number indicated below.

Respectfully submitted,



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IN THE DRAWINGS:

Please approve the changes to the drawings to Figures 23 and 25 as outlined in the attached Letter to the Office Draftsperson, and as shown in the accompanying revised replacement sheets of drawings for Figures 23 and 25. Specifically, in Figure 23, the spelling of the word “balancing” has been corrected. Also, in Figure 25, the spelling of the word “boundary” has been corrected.